Environmental and Social Consideration in Detailed Planning Survey
(Technical Cooperation for Development Planning)

1. Full title of the Project

The Project for Water Supply, Sewerage and Drainage Master Plan of Faisalabad

2. Type of the Study (e.g. Master Plan, Feasibility Study, Detailed Design, etc.)

Master Plan

3. Categorization and its reason

(1) Category: B

(2) Reason:

JICA project is not likely to have significant adverse impact on the environment under the JICA Guidelines for Environmental and Social Considerations (April, 2010) in terms of its sectors, characteristics and areas.

4. Agency or institution responsible for the implementation of the Project

Water and Sanitation Agency Faisalabad (WASA Faisalabad)

5. Outline of the Project (objectives, justification, location, proposed activities and scope of the study)

5.1 Objectives

The objective of the M/P is to formulate the integrated development plan for water supply, sewerage and drainage in service area of WASA Faisalabad and to clarify the feasible recommendations based on the verification

5.2 Location

Faisalabad in Pakistan

5.3 Scope of the Project

The scope of the Project would include the analysis of the present situation and capacity assessment, recommendations for improvement of institutional management which would be carried out by WASA Faisalabad, future investment plan including selection of priority projects for water supply, sewerage and drainage. The scope of the Project would also include technical transfer to the counterpart in the course of the Project.

5.3.1 Outputs

(1) To develop the integrated M/P for water supply, sewerage and drainage in Faisalabad

(2) To enhance the institutional capacity for implementation of the M/P

5.3.2 Activities

Basic Study

(1) Review of the Faisalabad Environmental Infrastructure M/P in 1993

(2) Collection and analysis of data and information

- Urban development and land use plan
- Natural and socio-economic conditions
- Current situations of water resources and water supply facilities
- Groundwater potential (including the possibility of deep fresh groundwater)
- Current situations of sewerage and drainage facilities
  (Including reassessment of pumping needs to avoid multiple pumping, and analysis of ponding areas)
- Law and regulation, policy, and organization related to water, sewerage and drainage
- Organization, operation, and financial management of WASA Faisalabad

(3) Water quality survey (water sources, raw and treated wastewater, industrial wastewater)

(4) Public awareness survey (socio-economic survey)

(5) Identification of issues on water supply, sewerage and drainage

Formulation of M/P

A. Water Supply

(1) Setting of planning strategy and goal of water supply plan

(2) Delineation of water supply service area

(3) Planning basis (population, per capita water consumption, non-domestic water supply volume, etc.)

(4) Water demand projection

(5) Water sources development plan

(6) Water supply pipeline plan (raw water transmission, treated water transmission, distribution network)

(7) Distribution water storage and pumping plan

(8) Water treatment plant (WTP) plan

(9) Phased implementation plan

(10) Project cost estimation
(11) Economic and financial evaluation
(12) Strategic Environmental Assessment
(13) Project evaluation
(14) Recommendation of priority project
(15) Preliminary design for the priority project

B. Sewerage and Drainage

(1) Setting of planning strategy and goal of sewerage and drainage plan
(Including integration of pumping systems, separation of wastewater and storm water, and storage of storm water)
(2) Delineation of sewerage and drainage planning area
(3) Planning basis (population, per capita wastewater generation, design influent and effluent quality, etc.)
(4) Trunk sewer plan and preliminary design
(5) Wastewater treatment plant (WWTP) plan and preliminary design
(6) Drainage plan and preliminary design
(7) Phased implementation plan
(8) Project cost estimation
(9) Economic and financial evaluation
(10) Strategic Environmental Assesment
(11) Project evaluation
(12) Recommendation of priority project

C. Institution and Finance

(1) Organization and management improvement plan
(2) Finance plan

<u>Pilot Activity for Water Supply</u>

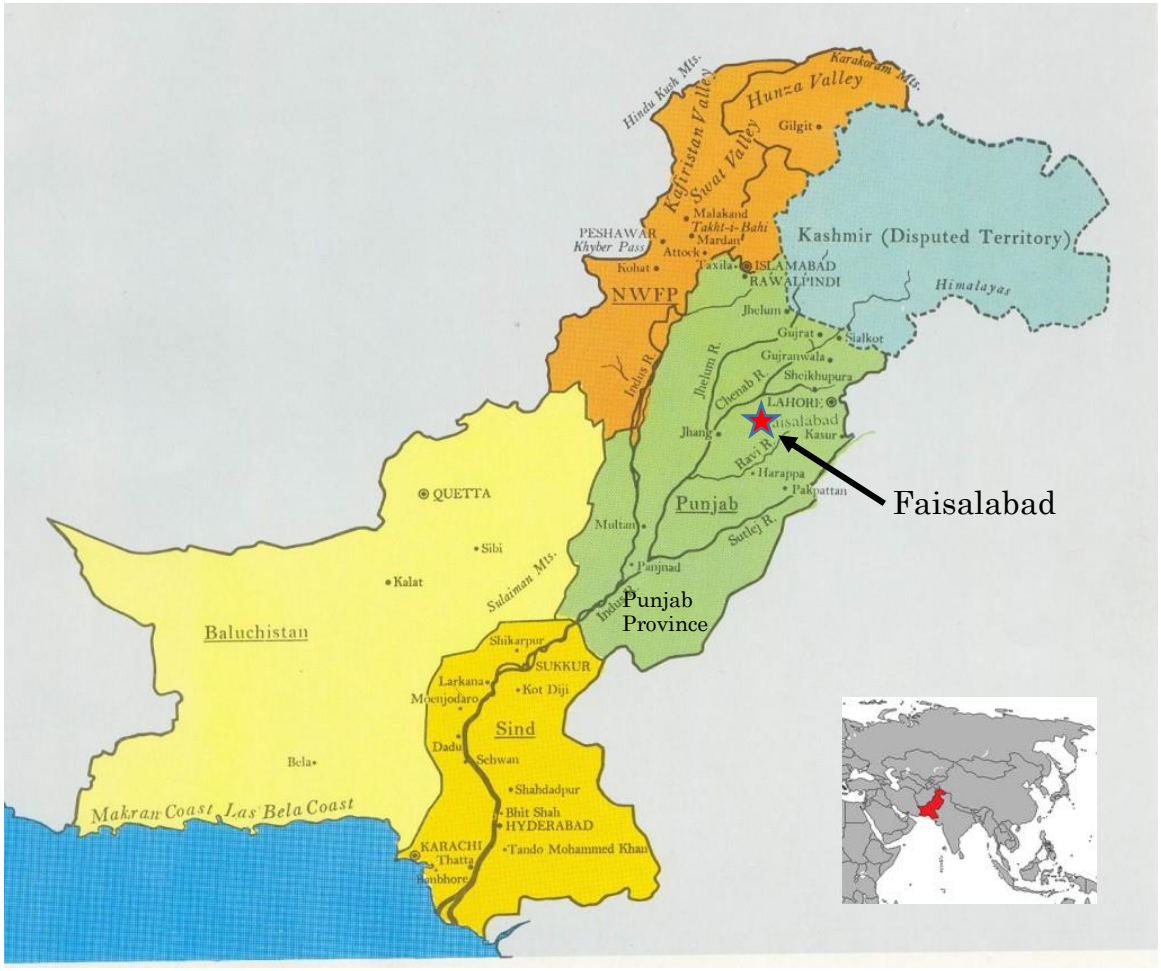
(1) Planning of pilot activity
(2) Selection of a pilot activity area
(3) Hydraulic isolation of the pilot activity area
(4) Improvement of distribution
(5) Promotion activity for water meter installation
(6) Leakage detection and repair work
(7) Legalization of illegal connections
(8) Improvement of bill collection

(9) Training of meter readers

(10) Evaluation and recommendations

6. Description of the project site (maps, environmental and social condition, current issues, etc.)

6.1 Location map



6.2 Environmental and social condition

(1) Geology and topography

The project site has been endowed by nature with rich soil and shows a flat topography which is consist of alluvial deposits delivered by Chenub and Ravi rivers.

(2) Land use

The dominant land use in the Project site is residential, commercial and cropland。There are number of farmer's village/colonies in the vicinity of the Project site.

(3) Meteorology

The climate of the Project site touches extremes climate. The maximum temperature in summer (April to October) reaches 50℃. In winter (November to March), it may, at times, fall below freezing point.

(4) Water resources

1) Surface water

The Project site (Faisalabad) has risen from barren mass lying between the two rivers Ravi and Chenub. The river Ravi flows on the eastern and Chenub on the western boundary of the district. Lower Chenub canal from river Chenub is the main source of irrigation water, which meets the requirement of 80% of cultivated land. Contamination of the surface water has not been reported so far.

2) Groundwater

98% of water source consumed in the Project site depends on groundwater recharged from irrigation canals and rivers, and pumped up by mainly tube wells around Chenab River and Jhang Branch canal. Contamination of the groundwater has not been reported so far.

Declining of groundwater level took place in wide area surrounding the Chenub well field at the beginning of 2000s and it caused serious negative impact to the shallow well for agriculture use such as dry up of wells. The groundwater level declining almost stopped at present.

(5) Fauna and flora

Precious species of fauna and flora do not exist in the Project site. National park and protective zones are not also been set in the Project site.

(6) Races and Tribes

After colonization and independence a larger number of the people from various parts of the country, especially refugees from India (East Punjab) came over and settled in the district. The history of colonization in Faisalabad exercised a profound influence on the socio-economic pattern of the area, They belong to different races but due to inter-marriage, the castes have intermingled and it is now difficult to distinguish their entity and thus tribal system is no more dominated in the culture.

(7) Physical and cultural heritage

There are many mosques, Sikhism shrines and grave yards in the Faisalabad area as physical and cultural heritages. The presence of shrines, mosques and graveyards has a very sensitive religious and cultural significance in the society. Other than these, there is no cultural heritage in the city.

6.3 Current issues

With regard to sewerage and drainage, presently, a wastewater treatment plant operates in the western area of Faisalabad. Its capacity is very limited. Most of wastewater generated in Faisalabad is directly discharged to the rivers through drains without any treatment. In addition, there are some areas prone to inundation.

7. Legal Framework of Environmental and Social Considerations

7.1 Organization for Environmental Management

(1) Federal government institutions

Headed by a federal minister, the Ministry of Environment, Local Government and Rural Development is the main government organization responsible for protection of environment and resource protection. The Ministry works in collaboration with the Pakistan Environment Protection Council (PEPC) and the Federal and Provincial Environmental Protection Agencies (EPA) under Pakistan Environmental Protection Act 1997 (PEPA 1997). The PEPC and Federal EPA are primary responsible for administering the provisions of the PEPA 1997. The PEPC oversees the functioning of the Federal Environmental Protection Agencies.

The functions and powers of the PEPC include formulation of national environmental policy, enforcement of PEPA 1997, approval of National Environmental Quality Standards (NEQS), incorporation of environmental considerations into national development plans and policies and provide guidelines for the protection and conservation of biodiversity in general and for the conservation of renewable and non-renewable resources.

Federal EPA has overall jurisdictions over Environmental Impact Assessment or Initial Environmental Examination (EIA/IEE) issues. The jurisdiction of the Federal EPA is applicable to the projects as under:

- On Federal land;
- Military projects;
- Involving trans-country impacts; and
- Bearing trans-province impacts

(2) Provincial government institutions

Each provincial government has its own environmental protection institution responsible for pollution control. The provincial Environmental Protection Agencies or Environmental Protection Departments (EPA/EPD) are the provincial counterparts of Federal EPA, which is authorized to delegate powers to provincial EPA/EPD.

The reports covering IEEs and EIAs are submitted to the concerned provincial EPA/EPD for approval. For public works, responsibility for IEE and EIA management & review and

granting or refusing environmental approval, will be vested in the provincial Planning and Development Departments (P&Ds) responsible for economic and development planning at provincial levels.

(3) Local government institutions

At the district level District Environment Officer (DOE) is the responsible person to look after the environmental issues in all the sectors. The issues identified by the DEO are reported to the provincial EPA/EPD for legal proceeding. The DEO can take action against any development activity contributing in the environmental degradation of the country.

7.2 Environmental legislation and policies

(1) Pakistan Environmental Protection Ordinance, 1983

Pakistan Environmental Protection Ordinance, 1983 was the first piece of legislation designed specifically for the protection of the environment. The promulgation of this ordinance was followed, in 1984 by the establishment of the Federal EPA, the primary government institution dealing with environmental issues. Provincial EPAs were also established at about the same time.

(2) National Conservation Strategy, 1992

The Pakistan National Conservation Strategy, 1992 is the principal policy document for environmental issues in the country that was developed and approved by the Government of Pakistan. This strategy works on a ten-year planning and implementation cycle. It deals with fourteen (14) core areas such as maintaining soils in cropland, protecting watershed, conserving biodiversity, managing urban waste, preserving the cultural heritages and so on.

Project specific mitigation prescriptions cannot be expressed in the Strategy, however, the principles of environmental protection, conservation and management provided in the Strategy have to be used as guidelines during the planning and execution of project.

(3) Pakistan Environmental Protection Act (PEPA) of 1997

Pakistan Environmental Protection Act (PEPA) of 1997 was enacted repealing the Pakistan Environmental Protection Ordinance, 1983. The PEPA 1997 provides the framework for implementation of National Conservation Strategy 1992, protection and conservation of species, wildlife habitats and biodiversity, conservation of renewable resources, establishment of standards for the quality of the ambient, water and land, establishment of Environmental Tribunals, appointment of Environmental Magistrate, Initial Environmental Examinations (IEE), Environmental Impact Assessment (EIA), promotion of public education and awareness of environmental issues through mass media.

The PEPA, 1997 is the basic legislative tool empowering the Government to frame regulations for the protection of the environment. The PEPA, 1997 is also applicable to a board range of issues and extends to air, water, soil, and noise pollution, as well as to handling of hazardous wastes. Penalties have been prescribed for those contravening the provisions of the Act.

(4) National Environmental Quality Standards (NEQS)

In order to control of the environmental pollution, the Government of Pakistan has laid down National Environmental Quality standards (NEQS), 2000 for municipal and industrial liquid effluent, industrial gaseous emissions, motor vehicle exhaust and noise.

(5) Federal EPA environmental assessment procedures

Federal EPA has published a set of environmental guidelines and procedures for conducting environmental assessments and the environmental management of different types of development projects. The guideline are applicable to various development projects.

(6) Pakistan environmental protection agency (Review of IEE and EIA) regulations, 2000

These regulations clearly define the categories of the projects requiring an IEE or EIA, review fees by EPA, filling process of the environmental reports, public participation, decisions by EPA, conditions of approval, compliance of reports and monitoring of the environmental parameters etc.

(7) National Environmental Policy, 2005

The National Environmental Policy provides an over reaching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change.

The goal and objectives of the Policy are as follows:

1) Goal

The National Environmental Policy aims to protect, conserve and restore Pakistan’s environment in order to improve the quality of life of citizens through sustainable development.

2) Objectives

- Conservation, restoration and efficient management of environmental resources
- Integration of environmental considerations in policy making and planning processes
- Capacity building of government agencies and other stakeholders at all levels
- Meeting international obligations effectively in line with the national aspirations
- Creation of demand for environment through mass awareness and community mobilization

8. Provisional Scoping (Type and Magnitudes of possible adverse impacts and mitigation measures)

Provisional scoping was done for water supply projects and sewerage and drainage projects to be planned in the Master Plan.

Provisional Scoping Matrix for Water Supply Projects

No.	Item	Scoping Result			Rational of Assessment
		P	C	O	
Natural Environment					
1.1	Climate/ Meteorological Phenomena	D	D	D	P: No impact is expected as no engineering work is carried work at this stage. C&O: The impacts on micro-climate and micro meteorological phenomena are negligible because the project related structures will not disturb wind path.
1.2	Topography	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Changes in topographic condition might occur due to excavation and filling works. Balancing the volume of excavation and filling is recommended to minimize the volume of surplus soil. O: Topographic condition will be stable after the completion of the facilities.
1.3	Geology	D	D	D	P,C&O: No impact is expected as the project does not alter the geological condition of the area.
1.4	Soil Erosion	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Soil erosion might take place in the construction works of the facilities at rainy season. O: Soil erosion will not take place after the completion of the facilities.
1.5	Hydrology	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Construction work might cause minor and temporally impact on hydrology. O: Water intake does not cause impact on hydrology because the water will be taken from irrigation canal which is controlled artificially.
1.6	Groundwater	D	D	C-	P: No impact is expected as no engineering work is carried work at this stage. C: Construction work of the facilities will not accompany the groundwater abstraction. O: Supplemental groundwater development may cause the groundwater decline. Careful design of well field must be done to avoid the influence to the existing wells in the vicinity of the well field.
1.7	Ecosystem, Flora, Fauna and Biodiversity	D	B-	D	P: No impact is expected. No unique/endangered species do not inhabit in the project area. C: Trees and bushes will be cut during the construction work of the facilities. The quantity of tree and bush trimming should be kept to the minimum. O: No impact is expected during the operation stage.
1.8	Protected area/Forest	D	B-	D	P: There is no protected area and forest in the project area. C: Construction work of the facilities will demolish some part of plantation such as sugar cane, maize.

					O: No impact is expected in operation stage.
1.9	Coastal Zone	D	D	D	P,C&O: Project area is located inland.
1.10	Landscape	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage.
					C: Construction work might cause minor and temporally impact on landscape.
					O: No impact is expected in operation stage.
1.11	Natural Disaster	D	D	D	P,C&0: Water supply project will not induce natural disaster.
Living Environment (Pollution Control)					
2.1	Air Pollution	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage.
					C: A certain amount of air pollutants is expected to be emitted from the use of vehicles and heavy machines during construction work of the facilities.
					O: Chlorine used for sterilization may leak from drinking water treatment plant in case of the accidents.
2-2	Offensive Odor	D	D	D	P,C&0: Offensive odor will not be generated on the water supply project because any source materials of odor will not be used.
2-3	Water Pollution	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage.
					C: Turbid water from the construction sites may pollute neighboring areas.
					O: No impact is expected in operation stage.
2-4	Bottom Sediment Contamination	D	D	D	P,C&0: Water supply project will not contaminate bottom sediment in the rivers and canals.
2-5	Soil Contamination	D	D	D	P,C&0: Water supply project will not contaminate soil.
2-6	Land Subsidence	D	D	B-	P: No impact is expected as no engineering work is carried work at this stage.
					C: AS groundwater abstraction will not be done in construction work of the facilities, land subsidence will not take place.
					O: Land subsidence might take place in case of the supplementary groundwater development, but, the impact will be very limited and negligible because the foundation of the project area is mainly composed of sand layers. In fact, land subsidence was not reported in Chenub well field where serious groundwater table declined covering very wide area happened due to the excessive groundwater abstraction.
2-7	Noise/Vibration	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage.
					C: Noise and vibration will be generated from the construction sites of the facilities.
					O: Although the operation of pumps and other machines will cause some noise and vibration, there will be no significant impact since such facilities are normally located away from the congested city zone.
2-8	Sunshine Obstruction	D	D	D	P,C&0: Water supply project will not cause sunshine obstruction.
2-9	Waste/Hazardous Materials	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage.
					C: Construction work of the facilities will generate surplus soil and construction debris.
					O: Drinking water treatment plant will produce sludge.
Social Environment					
3-1	Involuntary Resettlement	C-	D	D	P: Although main facilities are planned to be constructed in the plantation areas without houses,

					the plans are always subject to change depending on the conditions in future and involuntary resettlement may occur. Minimizing the resettlement should be the priority for facility design.
					C: Resettlement will be completed in the pre-construction stage.
					O: No resettlement will occur in operation stage.
3-2	Land Acquisition	C-	D	D	P: Land acquisition of wide area from several land owners will be needed for the construction of drinking water treatment plant. Width of the land acquisition will change depending on the scale, treatment method and other conditions.
					C: Land acquisition will be completed in the pre-construction stage.
					O: No land acquisition will occur in operation stage.
3-3	Utilization of Local Resources	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage.
					C: Mass scale use of local resources such as sand and quarrying for the construction of the facilities may obstruct these utilization by the local people for other purposes.
					O: No impact is expected in operation stage.
3-4	General, Regional/City Plans	D	D	B+	P: No impact is expected.
					C: No impact is expected in construction stage.
					O: Better infrastructure may cause economic development in the Project area.
3-5	Social Institutions	D	D	D	P,C&O: No impact is expected as there will be no change in social institutions.
3-6	Social Infrastructure and Services	D	B-	A+	P: No impact is expected as no engineering work is carried work at this stage.
					C: Access to social infrastructure and services may be temporarily affected due to construction work of the facilities as well as traffic jams due to the operation of construction vehicles.
					O: The project will highly improve water supply service of the city.
3-7	Local Economy and Livelihood	B-	B-/B+	B+	P: Loss of income source and livelihood due to involuntary resettlement are expected to negatively affect the local economy and livelihood.
					C: Temporal traffic prohibition and traffic jam accompanied with construction work may give negative impact to the local economy. On the other hand, construction works of the facilities will have positive impact on local economy by creating employment and business opportunity in the project area.
					O: Improvement of water supply service will cause the living condition improvement and conclusively lead to the improvement of the livelihood.
3-8	Unequal Distribution of Benefit and Damage	B-	B-	B-	P: Land acquisition and involuntary resettlement will lead to unequal distribution of benefit and damage between groups who are directly affected by the project and who are not.
					C: While resettling households bear much of damage, other may get benefits from new business relating the construction works, resulting in unequal distribution of benefit and damage.
					O: No impact is expected in operation stage.
3-9	Local Conflict and Inequity	D	D	B-	P: No impact is expected.
					C: No impact is expected in construction stage.
					O: Improvement of water supply service will start from priority area and areas other than priority area cannot receive the improved water supply services.

					Such unequal distribution of the services may cause complaint among the people.
3-10	Water Usage, Water Rights	C-	D	C-	P: Negotiation with Irrigation Department must be needed for sharing limited surface water source. C: No impact is expected during construction stage. O: Reduction of the irrigation canal flow directly affect the farmers. Regular discussion with affected farmers and compensation for affected farmers must be indispensable.
3-11	Cultural and Historical Heritage	D	D	D	P: There is no cultural and historical heritage in the project area. C&O: No impact is expected as the project will not affect cultural and historical heritage.
3-12	Religious Facilities	B-	B-	D	P: There are many mosques, Sikhism shrines and grave yards in the city which have a very sensitive religious and cultural significance in the society. Such religious facilities must not be included in the construction sites. C: Roadside religious facilities may be affected by noise and vibration during construction of the facilities. O: No impact is expected in operation stage.
3.13	Sensitive Facilities (ex. Hospital, school, precision machine factory)	D	C-	D	P: Sensitive facilities will not be included in the construction sites in the planning. C: Roadside sensitive facilities may be affected by noise and vibration during construction of the facilities. O: No impact is anticipated in operation stage.
3,14	Poor People	D	B+	C-	P: It is necessary to assess their ability to pay water charge and develop mitigation measures in the planning stage. C: They might be benefitted from employment opportunities during construction work. O: They may not be affordable to pay water charge and the mitigation measures must be needed.
3.15	Ethnic Minorities /Indigenous People	D	D	D	P,C&O: There are no ethnic minorities and indigenous groups in Faisalabad.
3.16	Gender	D	D	B+	P: No impact is expected. C: Equal opportunity should be sought for employment during construction work. O; Improved water supply service will reduce the burden of girls and women who carry water.
3.17	Children's Rights	D	D	D	P: No impact is expected. C&O: Child labor is unlawful and only adult is eligible for employment opportunity created by the project.
3.18	Public Health	D	D	A+	P: No impact is expected. C: Influx of construction workers is likely to increase the health risk, particularly HIV/AIDS. However the infection risk of HIV/AIDS is quite low as infection ratio of HIV/AIDS is 0.1% to 0.2% in Pakistan (UNAIDS 2014). O: Improved water supply service will greatly contribute the improvement of public health in the project area.
3.19	Occupational Health and Safety (OHS)	D	B-	B-	P: No impact is expected. C: Occupational Health and Safety of construction work should be properly managed through adequate labor management. O: Occupational Health and Safety of operation and maintenance work of the facilities should be properly managed through adequate labor management.

Others					
4.1	Accidents	D	B-	B-	P: No impact is expected. C: Accidents associated with construction work should be properly managed through adequate labor management. O: Accidents associated with operation and maintenance work of the facilities should be properly managed through adequate labor management.
4.2	Greenhouse Effect Gas (GHG) Emissions	D	D	D	P: No impact is expected. C: The use of construction machines and operation of vehicles will result in increase in GHG emissions. However, its affection is temporal and negligible for the global climate change. O: GHG will not be emitted from the facilities because commercial electric power will be used for operation of the facilities.

Note: P: Pre-Construction, C: Construction, O: Operation

A: Significant impact is expected (+: Positive impact, -: Negative impact)

B: Some impact is expected (+: Positive impact, -: Negative impact)

C: Extent of impact is unknown, further examination will be required (+: Positive impact, -: Negative impact)

D: No impact is expected

Provisional Scoping Matrix for Sewerage and Drainage Projects

No.	Item	Scoping Result			Rational of Assessment
		P	C	O	
Natural Environment					
1.1	Climate/ Meteorological Phenomena	D	D	D	P: No impact is expected as no engineering work is carried work at this stage. C&O: The impacts on micro-climate and micro meteorological phenomena are negligible because the project related structures will not disturb wind path.
1.2	Topography	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Changes in topographic condition might occur due to excavation and filling works. Balancing the volume of excavation and filling is recommended to minimize the volume of surplus soil. O: Topographic condition will be stable after the completion of the facilities.
1.3	Geology	D	D	D	P,C&O: No impact is expected as the project does not alter the geological condition of the area.
1.4	Soil Erosion	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Soil erosion might take place in the construction works of the facilities at rainy season. O: Soil erosion will not take place after the completion of the facilities.
1.5	Hydrology	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Construction work might cause minor and temporally impact on hydrology O: Waste water discharge into the rivers does not cause impact on hydrology because the quantity is very small compared to the river flow rate.
1.6	Groundwater	D	D	C-	P: No impact is expected as no engineering work is carried work at this stage. C: Construction work of the facilities will not include groundwater abstraction.

					O: No impact is expected as groundwater abstraction will not be done in the operation of waste water treatment plant.
1.7	Ecosystem, Flora, Fauna and Biodiversity	D	B-	D	P: No impact is expected. No unique/endangered species do not inhabit in the project area.
					C: Trees and bushes will be cut during the construction work of the facilities. The quantity of tree and bush trimming should be kept to the minimum.
					O: No impact is expected during the operation stage.
1.8	Protected area/Forest	D	B-	D	P: There is no protected area and forest in the project area.
					C: Construction work of the facilities will demolish some part of plantation such as sugar cane, maize.
					O: No impact is expected during the operation stage.
1.9	Coastal Zone	D	D	D	P,C&O: Project area is located inland.
1.10	Landscape	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage.
					C: Construction work might cause minor and temporally impact on landscape.
					O: No impact is expected during the operation stage.
1.11	Natural Disaster	D	D	B+	P&C: Sewage and drainage project will not induce natural disaster.
					O: Drainage project will mitigate flood damage in the city.
Living Environment (Pollution Control)					
2.1	Air Pollution	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage.
					C: A certain amount of air pollutants is expected to be emitted from the use of vehicles and heavy machines during construction work of the facilities.
					O: Waste water treatment plant will not discharge air pollutant.
2-2	Offensive Odor	D	D	B-	P&C: Offensive odor will not be generated on the water supply project because any source materials of odor will not be used.
					O: Waste water treatment plant may emit offensive odor, but its influence will be very limited because the plants will be constructed sub-urban area apart from the city.
2-3	Water Pollution	D	B-	C-	P: No impact is expected as no engineering work is carried work at this stage.
					C: Turbid water from the construction sites may pollute neighboring areas.
					O: There is some possibility of canal water pollution, if treated waste water including factory effluent will be discharge into the canal.
2-4	Bottom Sediment Contamination	D	D	D	P,C&0:Sewerage and drainage project will not contaminate bottom sediment in the rivers and canals.
2-5	Soil Contamination	D	D	C-	P&C: Sewerage and drainage project will not contaminate soil in these stages.
					O: Sludge from waste water treatment plant may contaminate soil.
2-6	Land Subsidence	D	D	D	P: No impact is expected as no engineering work is carried work at this stage.
					C: As groundwater abstraction will not be done in construction work of the facility, land subsidence will not take place.
					O: Sewerage and drainage project will not cause land subsidence because groundwater abstraction

					will not be done.
2-7	Noise/Vibration	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage. C: Noise and vibration will be generated from the construction sites of the facilities. O: Although the operation of pumps and other machines will cause some noise and vibration, there will be no significant impact since such facilities are normally located away from the congested city zone.
2-8	Sunshine Obstruction	D	D	D	P,C&0: Sewerage and drainage project will not cause sunshine obstruction.
2-9	Waste/Hazardous Materials	D	B-	B-	P: No impact is expected as no engineering work is carried work at this stage. C: Construction work of the facilities will generate surplus soil and construction debris. O: Waste water treatment plant will produce sludge containing organic matters and hazardous materials such as heavy metals.
Social Environment					
3-1	Involuntary Resettlement	C-	D	D	P: Although main facilities are planned to be constructed in the plantation areas without houses, the plans are always subject to change depending on the conditions in future and involuntary resettlement may occur. Minimizing the resettlement should be the priority for facility design. C: Resettlement will be completed in pre-construction stage. O: No resettlement will occur in operation stage.
3-2	Land Acquisition	C-	D	D	P: Land acquisition of wide area from several land owners will be needed for the construction of waste water treatment plant. Width of the land acquisition will change depending on the scale, treatment method and other conditions. C: Land acquisition will be completed in pre-construction stage. O: No land acquisition will occur in operation stage.
3-3	Utilization of Local Resources	D	B-	D	P: No impact is expected as no engineering work is carried work at this stage. C: Mass scale use of local resources such as sand and quarrying for the construction of the facilities may obstruct these utilization by the local people for other purposes. O: No impact will be anticipated in operation stage.
3-4	General, Regional/City Plans	D	D	B+	P: No impact is expected. C: No impact is expected in construction stage. O: Better infrastructure may cause economic development in the Project area.
3-5	Social Institutions	D	D	D	P,C&O: No impact is expected as there will be no change in social institutions.
3-6	Social Infrastructure and Services	D	B-	A+	P: No Impact is expected as no engineering work is carried work at this stage. C: Access to social infrastructure and services may be temporarily affected due to construction work of the facilities as well as traffic jams due to the operation of construction vehicles. O: Sewerage and drainage project will highly improve the sanitary environment of the city.
3-7	Local Economy and Livelihood	B-	B-/B+	B+	P: Loss of income source and livelihood due to involuntary resettlement are expected to negatively affect the local economy and livelihood. C: Temporal traffic prohibition and traffic jam accompanied with construction work may give

					negative impact to the local economy. On the other hand, construction works of the facilities will have positive impact on local economy by creating employment and business opportunity in the project area.
					O: Sewerage and drainage project will greatly improve sanitary condition of the city and conclusively lead to the improvement of the livelihood.
3-8	Unequal Distribution of Benefit and Damage	B-	B-	B-	P: Land acquisition and involuntary resettlement will lead to unequal distribution of benefit and damage between groups who are directly affected by the project and who are not.
					C: While resettling households bear much of damage, other may get benefits from new business relating the construction works, resulting in unequal distribution of benefit and damage.
					O: No impact is expected in operation stage.
3-9	Local Conflict and Inequity	D	D	B-	P: No impact is expected.
					C: No impact is anticipated in construction stage.
					O: Sewerage and drainage project will start from priority area and areas other than priority area cannot receive beneficence that is environmental improvement. Such unequal distribution of the services may cause complaint among the people.
3-10	Water Usage, Water Rights	D	D	D	P: No impact is expected.
					C: No impact is expected in construction stage.
					O: No impact is expected in operation stage.
3-11	Cultural and Historical Heritage	D	D	D	P: There is no cultural and historical heritage in the project area.
					C&O: No impact is expected as the project will not affect cultural and historical heritage.
3-12	Religious Facilities	B-	B-	D	P: There are many mosques, Sikhism shrines and grave yards in the city which have a very sensitive religious and cultural significance in the society. Such religious facilities must not be included in the construction sites.
					C: Roadside religious facilities may be affected by noise and vibration during construction of the facilities.
					O: No impact is expected in operation stage.
3.13	Sensitive Facilities (ex. Hospital, school, precision machine factory)	D	C-	D	P: Sensitive facilities will not be included in the construction sites in the planning.
					C: Roadside sensitive facilities may be affected by noise and vibration during construction of the facilities.
					O: No impact is expected in operation stage.
3,14	Poor People	D	B+	C-	P: It is necessary to assess their ability to pay waste water charge and develop mitigation measures in the planning stage.
					C: They might be benefitted from employment opportunities during construction work.
					O: They may not be affordable to pay waste water charge and the mitigation measures must be needed.
3.15	Ethnic Minorities /Indigenous People	D	D	D	P,C&O: There are no ethnic minorities and indigenous groups in Faisalabad.
3.16	Gender	D	D	D	P: No impact is expected.
					C: Equal opportunity should be sought for employment in construction work.
					O; No impact is expected in operation stage.
3.17	Children's Rights	D	D	D	P: No impact is expected.
					C&O: Child labor is unlawful and only adult is eligible for employment opportunity created by the

					project.
3.18	Public Health	D	D	A+/C-	P: No impact is expected. C: Influx of construction workers is likely to increase the health risk, particularly HIV/AIDS. However, the infection risk of HIV/AIDS is quite low as infection ratio of HIV/AIDS is 0.1% to 0.2% in Pakistan (UNAIDS 2014). O: Improvement of sewerage and drainage system will greatly contribute the improvement of public health in the project area. In case that the treated waste water will be planned to be discharged to irrigation canal, farmer's health may be damaged by the toxic substances included in the treated waste water.
3.19	Occupational Health and Safety (OHS)	D	B-	B-	P: No impact is expected. C: Occupational Health and Safety of construction work should be properly managed through adequate labor management. O: Occupational Health and Safety of operation and maintenance work of the facilities should be properly managed through adequate labor management.
Others					
4.1	Accidents	D	B-	B-	P: No impact is expected. C: Accidents associated with construction work should be properly managed through adequate labor management. O: Accidents associated with operation and maintenance work of the facilities should be properly managed through adequate labor management.
4.2	Greenhouse Effect Gas (GHG) Emissions	D	D	D	P: No impact is expected. C: The use of construction machines and operation of vehicles will result in increase in GHG emissions. However, its affection is temporal and negligible for the global climate change. O: GHG will not be emitted from the facilities because commercial electric power will be used for operation of the facilities.

Note: P: Pre-Construction, C: Construction, O: Operation

A: Significant impact is expected (+: Positive impact, -: Negative impact)

B: Some impact is expected (+: Positive impact, -: Negative impact)

C: Extent of impact is unknown, further examination will be required (+: Positive impact, -: Negative impact)

D: No impact is expected

9. Mitigation Measures

Detailed mitigation measures cannot be proposed in this stage and will be examined in the Master Plan. Assumable mitigation measures in this stage will be described for the main environmental items below.

9.1 Natural Environment

(1) Groundwater

Water Supply Project

In case that the supplemental groundwater development will be planned in the Master Plan, groundwater development method should be same with the method employed in groundwater development in Jhang well field. Proper well discharge rate and well spacing were determined based on the hydrogeological calculation in order to avoid influence to the existing farmer's wells.

In addition, social measures such as setting of regular meeting with farmers and compensation to the farmers (construction of road and school) were conducted in this project.

(2) Ecosystem, Flora, Fauna and Biodiversity

Water supply, Sewerage and Drainage Project

The quantity of tree and bush trimming necessary for the construction work should be kept to minimum. New and good condition machinery with minimum noise will be used in construction. Plantation of trees and bushes will be done in the construction sites in order to regain the ecological habit.

9.2 Living Environment (Pollution Control)

(1) Air Pollution

Water supply, Sewerage and Drainage Project

Construction vehicles and heavy machines shall be properly maintained to minimize air pollutants

Water Supply Project

Safety devices to detect and neutralize chlorine leakage should be installed in chlorination facilities in the treatment plants, and operation manuals for related facilities should be properly formulated and distributed to the workers.

(2) Offensive Odor

Sewerage and Drainage Project

When designing sewage treatment facilities, it is necessary to arrange the design to prevent the leakage of offensive odor flowing outside of the premises. Waste water treatment facilities shall be properly maintained to minimize offensive odor.

(3) Water Pollution

Water supply, Sewerage and Drainage Project

Materials and construction methods that reduce muddy water shall be adopted, and measures to prevent muddy water from directly flowing into the canals, such as construction of simplified weirs, shall be conducted.

Sewerage and Drainage Project

With respect to discharged water from sewage treatment plants, facilities which have enough capacity to meet effluent standards need to be set up.

In case that the treated waste water will be discharged into the irrigation canals, pollution of canal water should be carefully examined, and if the pollution will be anticipated, idea of treated waste water discharging into the irrigation canal should be reconsidered.

(4) Soil Contamination

Sewerage and Drainage Project

Sewerage sludge needs to be disposed of in a way to prevent leakage in the sections surrounded by concrete or other impervious materials.

(5) Land Subsidence

Water Supply Project

Land subsidence might take place in case of the supplementary groundwater development, but, the impact will be very limited and negligible because the foundation of the project area is mainly composed of sand layers. In fact, land subsidence was not reported in Chenub well field where serious groundwater table declined covering very wide area happened due to the excessive groundwater abstraction. However, it will be better that the monitoring system for groundwater level and land subsidence will be prepared in case of groundwater development and, if indication of land subsidence will be found, the abstraction should be stopped or reduced immediately.

(6) Noise and Vibration

Water supply, Sewerage and Drainage Project

Construction vehicles and heavy machines shall be properly maintained to minimize noise and vibration. Construction works in early morning and night should be avoided.

(7) Waste/Hazardous Materials

Water supply, Sewerage and Drainage Project

Waste soil generated from construction sites should be used for back-filing. Construction companies and workers shall be guided not to leave waste soil and other waste in construction sites. Sludge from drinking water treatment plants without hazardous substances should be also used for back-filling.

9.3 Social Environment

(1) Involuntary Resettlement

Water supply, Sewerage and Drainage Project

Although main facilities are planned to be constructed in the plantation areas without houses, the plans are always subject to change depending on the conditions in future and involuntary resettlement may occur. Minimizing the resettlement should be the priority for facility design.

It is necessary to conduct on-site investigation to identify the necessity of resettlement and its scale when planning individual projects. It is also necessary to coordinate with local residents to be affected, and obtain their consent. If large scale resettlement is expected, a resettlement action plan shall be formulated and released to the public based on the JICA Guidelines for Environmental and Social Considerations. The action plan needs to include due compensation for relocation and support for re-establishment of the relocated resident's livelihoods. At the stage of Master Plan in which details are not determined, a resettlement policy framework shall be formulated, and a survey on resettlement shall be performed when details of individual projects are put together.

The amount of compensation shall be calculated at full replacement cost including market price of the property, cost for ground leveling, registration fees and other related expenses. Support for re-establishment of livelihood shall be provided to improve the living standard or at least to restore it to the pre-project level.

(2) Land Acquisition

Water supply, Sewerage and Drainage Project

On-site investigation shall be conducted to identify lands to be acquired and their right holders when planning individual projects. It is also necessary to coordinate with local residents to be affected, and obtain their consent. The amount of compensation will be determined based on the market price.

(3) Unequal Distribution of Benefit and Damage

Water supply, Sewerage and Drainage Project

Sound arbitration and conflict resolution mechanism among benefitted people and damaged people such as resettled households by the project. Such mechanism should be formulated and leaded by WASA Faisalabad and local leaders.

(4) Local Conflict and Inequity

Water supply, Sewerage and Drainage Project

Local stakeholder meetings shall be held to coordinate with local residents, and the result of the meetings shall be properly reflected in a project plan.

(5) Water Usage, Water right

Water Supply Project

Stakeholder meeting including WASA Faisalabad, irrigation department, farmers who are affected by the reduction of irrigation canal flow caused by canal water intake for municipal purposes and farmer's organization shall be held to solve the issues, and the result of the meetings shall be properly reflected in a project plan. Discharge of treated waste water into the canals may be thought as one of mitigation measures. Compensations to the farmers to be affected by the project which are life environmental improvement such as construction of roads and schools shall be discussed in the meetings. Well construction for irrigation will be considered as one of the compensations.

(6) Religious Facilities

Water supply, Sewerage and Drainage Project

Impacts on religious facilities shall be confirmed in local stakeholder meetings. Based on the result of the meeting, necessary measures shall be undertaken. If certain impacts on religious facilities are expected, it is necessary to consider mitigation measures such as piping route change in consultation with local residents, Faisalabad, religious leaders and other stakeholders.

(7) Poor People

Water supply, Sewerage and Drainage Project

Impacts on poor people who cannot afford to pay water and sewage fee shall be confirmed in local stakeholder meetings, necessary measures such as lowering of fees for poor people shall be undertaken.

(8) Public Health

Sewerage and Drainage Project

In case that the treated waste water will be planned to be discharged to irrigation canal, adverse effect to farmer's health must be examined in consultation with University of Agriculture Faisalabad which is doing research on re-use of treated waste water for irrigation. If it will be inferred that canal water mingled with treated waste water may give adverse effect to farmer's health, necessary measures such as increment of treatment degree and withdrawal of the plan should be considered.

(9) Occupational Health and Safety

Water supply, Sewerage and Drainage Project

Occupational health and safety of the construction works and operation works of the facilities should be managed properly through adequate labor management and education.

9.4 Others

(1) Accident

Water supply, Sewerage and Drainage Project

Safety education shall be provided to construction workers and operation workers of the facilities to prevent accidents. Traffic safety education should be also provided to drivers of construction vehicles. Facilities shall be fenced to prevent the entry of local residents and livestock.

9. Alternatives to the project activities including "without project" option

The Project is to re-examine the current situation and problems in the water supply, sewage and drainage sectors in Faisalabad, and formulate the Master Plan based on the re-examination results.

Alternatives to the project activities including 'without project' option will be studied at Master Plan Study Stage.

10. Result of the consultation with recipient government on environmental and social consideration including roles and responsibilities

WASA Faisalabad will abide by 'JICA Guidelines for Environmental and Social Considerations' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

11. Terms of reference for environmental and social considerations

Pakistan side agrees that the Project should include Terms of Reference (TOR) for Environmental and Social Considerations in line with the JICA Guidelines as follows:

(1) Review of existing development plans, development projects, studies, and public and private investments;
(2) Analysis to identify constraints to development, factors of promoting development;
(3) Analysis of alternatives for achieving the goals of the Project;
(4) Consideration of contents of developed policy and plans;
(5) Scoping (clarify extremely important items on environmental and social impacts and its evaluation methods at the time of decision making of the M/P;
(6) Confirmation of existing environmental and social conditions of the proposed project area in the M/P as a base line data (land use, natural environment, culture and lifestyle of indigenous people and their communities, local economy and

socio-cultural environment and others);

(7) Confirm legal framework and institution of Pakistan on environmental and social considerations, and examine the experiences of SEA study in Pakistan; a) Laws, regulations and standards related to environmental and social considerations (environmental impact assessment, resettlement, public participation, information disclosure and others);

(8) SEA Study reports conducted in Pakistan, development projects, and other relevant information:

(9) Gaps between the “JICA Guidelines for Environmental and Social Considerations (April 2010)” and legal framework of Pakistan on environmental and social considerations;

(10) Outlines of relative agencies and institutions responsible for the implementation of the projects;

(11) Prediction of likely impacts of proposed projects in the M/P;

(12) Assessment of likely impacts of the projects above 11) and comparative analysis of alternatives of proposed projects, including “without project” option;

(13) Examination of the mitigation measures (to be avoided, minimized and compensated);

(14) Examination of the monitoring methods (monitoring items, frequencies and methods); and

(15) Support to hold stakeholder meetings.

(16) Support to hold information disclosure.

(17) Scoping for the selected prioritized project (including the development of possible alternative analysis, the clarification of important items on environmental and social impacts and its evaluation methods)

12. Other relevant information

None